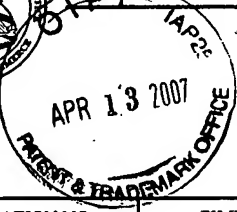




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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,989	01/26/2004	Sigrid Buhler	14.1-11	6777
61638 7590 03/22/2007 SIGMA-ALDRICH CO. 3050 SPRUCE STREET ST. LOUIS, MO 63013			EXAMINER ISSAC, ROY P	
			ART UNIT 1623	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE 3 MONTHS			MAIL DATE 03/22/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/764,989

Applicant(s)

BUHLER ET AL.

Examiner

Roy P. Issac

Art Unit

1623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 15 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-17 and 30-46 is/are pending in the application.
- 4a) Of the above claim(s) 18-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-17 and 30-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/15/2006
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This application claims priority to U.S. provisional application no. 60/449,070 filed on February 21, 2003.

This Office Action is in response to Applicant's amendment/ remarks/ response filed 12/15/2006, wherein claims 1, 5, 7-11, 17, 18, 20 and 24-27 were amended, claim 2 was cancelled, and new claims 30-46 were newly submitted. Claims 1, 3-17 and 30-46 are currently pending and are examined on the merits herein. Claims 18-29 are withdrawn from consideration as discussed in the office action dated 9/15/2006 of record.

### **Rejections Withdrawn**

As indicated above, applicant's arguments/response filed 15 December 2006 cancelled claim 2. All rejections made with respect to the cancelled claim, claim 2, in the previous office action are withdrawn.

The objection under 37 CFR 1.75(c) with respect to claims 9-11 is withdrawn, since claims 9-11 have been amended to depend from claim 1.

The Double patenting rejection with respect to claims 1-17 is withdrawn, since applicant's amendment to claim 1 and cancellation of claim 2 is sufficient to overcome the double patenting rejection with respect to claims 1-17.

The rejection under 35 USC 112 second paragraph, with respect to claims 9-11 in regards to the lack of antecedent basis is withdrawn, since claims 9-11 have been amended to depend from claim 1.

Art Unit: 1623

The rejection under 35 USC 112 second paragraph, with respect to claims 1-17 in regards to phrases "leaving group" and "protective group" is withdrawn, since applicants arguments were found persuasive.

The rejection under 35 USC 102(b) of claims 1-2, 8-11, 12 and 16-17 is withdrawn since applicants amendments will overcome anticipation rejection.

The rejection under 35 USC 103(a) of claims 1-17 over Pfleiderer et. al. is withdrawn since applicants amendments will overcome the rejection.

The following are new or modified rejections necessitated by Applicant's amendment filed 12/15/2006, wherein the limitations in pending claims 1, 3-17 as amended now have been changed since claims 1, 5, 7-11 and 17 has been amended and claims 3-17 depends from amended claims. The limitations in the amended claims have been changed and the breadth and scope of those claims have been changed. Therefore, rejections from the previous Office Action, filed 9/15/2006, have been modified and are listed below.

### ***Double Patenting***

The following is a new ground of rejection necessitated by the submission of new claims 30-46.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct

Art Unit: 1623

from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 30-46 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 5,763,599 (Of Record).

Although the conflicting claims are not identical, they are not patentably distinct from each other because the '599 patent discloses compounds that are covered by the genus claim as well as position isomers of the instant application.

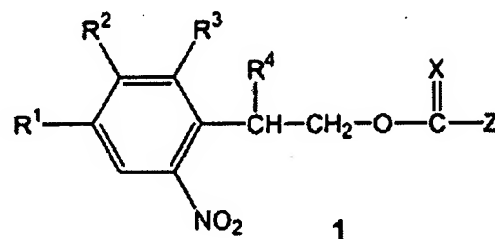
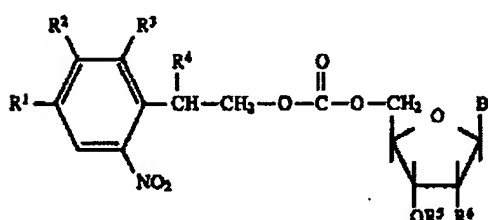
The claims of the instant application are drawn to compounds of the general formula 1. Note that some of the compounds of the general formula 1, and the compounds claimed in the '599 patent are either the same or position isomers.

The '599 patent does not expressly disclose the specific compounds where R1 is COOY, wherein Y is selected from the group consisting of an optionally substituted alkyl group of up to 10 carbons, under the proviso that R2 is selected from the group consisting of H, NO<sub>2</sub>, CN, OCH<sub>3</sub> or halogen or is an optionally substituted alkyl or alkoxy group, respectively, having up to 4 carbon atoms; or R1 is selected from the group consisting of H, NO<sub>2</sub>, CN, OCH<sub>3</sub> or halogen or an optionally substituted alkyl or

Art Unit: 1623

alkoxyl group respectively, having up to 4 carbon atoms, under the proviso that R<sub>2</sub> is selected from the group consisting of an optionally substituted aryl group, an optionally substituted heteroaryl group or an optionally substituted aroyl group.

Claims 1-14 of the '599 patent claims compounds with the following formula;



#### The '599 patent

R<sub>1</sub>= alkoxyalkyl having 1-4 C atoms

R<sub>2</sub>= H or OCH<sub>3</sub>

#### The instant application

Claims 1,2-17;

R<sub>1</sub>= H/OCH<sub>3</sub>

Claims 30-46

R<sub>1</sub>=COOY; Y is alkyl

R<sub>2</sub>= H/OCH<sub>3</sub>

Furthermore, the '599 patent discloses compounds with phosphoramidite substituents at the R<sub>5</sub> position (Claim 1, Column 28; lines 37-67 Column 24-25, Summary of the Preparation Examples, Compounds 15-17). The substituents at the R<sub>3</sub> and R<sub>4</sub> position are identically disclosed as the instant application. (Column 28, lines 50-60; Claim 1). The substituents R<sub>5</sub> and R<sub>6</sub> have significant overlap with the instant application. (Column 28, lines 57-67; Claim 1). The '599 patent further discloses substitution of Sulfur and Oxygen at the R<sub>6</sub> position as well as the use of protecting groups including silyl groups for oxygen. In particular, alkyl, alkenyl, acetal, S-alkyl, O-Methyl, O-ethyl, O-alkenyl O-allyl, O-acetal and O-tetrahydropyranyl groups

Art Unit: 1623

are disclosed. (Column 28, lines 37-67, Claim 1; Column 2, lines 52-65). The '599 patent discloses the use of the bases adenine, cytosine and guanine, and the protective groups p-NPEOC and ethylformamidino. (Column 29, lines 30-40, claims 10,11 and 13).

One of ordinary skill in the art would have been motivated to make the compounds with the general formula I and the particular compounds of claims 30-46 of the instant application, because the compounds of claims 30-46 are broadly disclosed in the '599 patent.

### **Claim Rejections - 35 USC § 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 2-17 and 30-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the phrases "a functional group useful in oligonucleotide synthesis", "chemically modified", "analog thereof", and "chemical modifications thereof". Said phrases do not convey a structural formula or chemical name to one of ordinary skill in the art. In the absence of a structural formula or chemical name, all claims reading upon a compound of general formula I wherein each variables are not distinctly claimed are indefinite as one of

Art Unit: 1623

ordinary skill in the art would not be apprised of the metes and bounds of claimed invention.

Claim 13 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the phrase "intermediate OH-protective group". Said phrases do not convey a structural formula or chemical name to one of ordinary skill in the art. In the absence of a structural formula or chemical name one of ordinary skill in the art would not be apprised of the metes and bounds of claimed invention.

Claims 1, 2-17 and 30-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1, from which claims 2-17 depend, recites "optionally substituted" in reference to alkyl, alkoxy, aryl, and aroyl heteroaryl groups. Claims 3 and 4 additionally recites "optionally substituted" in reference to phenyl and benzyl. The specification does not clearly define or point out what type of groups will be used in substitution and in what positions the substitutions will occur. As such, said recitation renders the claims indefinite:

### ***Response to Arguments***

Applicant's arguments filed 12/15/2006 have been fully considered but they are not persuasive to render the claimed invention patentable as further discussed below.

Art Unit: 1623

As indicated in the previous office action, the phrases "a functional group useful in oligonucleotide synthesis", "chemically modified", "analog thereof", and "chemical modifications thereof" does not convey any structural features to one of skill in the art. Applicants argue that "analogs of deoxyribonucleosides, ribonucleosides, deoxyribonucleosides, and ribonucleotides are well-known in the art." Applicants argue that there might be some compounds that might be some examples in the art of analogs. However, definition by exemplification does not convey to one of skill in the art the metes and bounds of the claimed invention. In regards to the phrase "chemically modified", the applicants points to definitions section in specification, Page 12, lines 22-page 13, line 11". The referred sections of the specification is a definition for "oligonucleotide", in which the term "oligonucleotide" is defined to include chemical modifications. The specification states that, "Modifications include, but are not limited to" a list of chemical reactions. There are no limiting definitions in the specification. Since the chemical modifications are only exemplified, and one of skill in the art will not readily know which reactions are included and which are excluded, the metes and bounds of the claims herein are not clearly defined. The phrase "a functional group useful in oligonucleotide synthesis" is also not clearly defined so that one of skill in the art will be apprised of the metes and bounds of the claimed invention herein. For the above reasons claims 1, 2-17 are considered properly rejected under 35 USC 112 second paragraph, in regards to phrases, "a functional group useful in oligonucleotide synthesis", "chemically modified", "analog thereof", and "chemical modifications thereof", and are adhered to.

Art Unit: 1623

**Claim Rejections - 35 USC § 102**

The following is a new ground of rejection necessitated by applicants amendments submitted 15 December 2006.

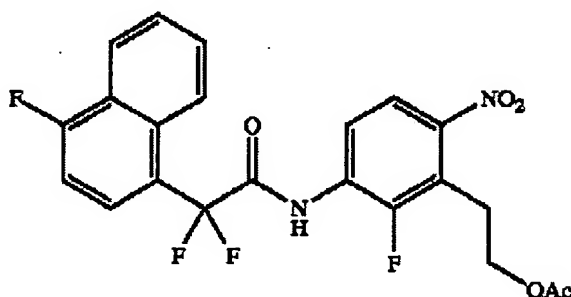
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Pan et. al. (U.S. Patent No. 6,900,231; PTO-892).

Pan et. al. discloses the following compound. (Column 43, lines 35-45).



This compound anticipates the generic structure 1 herein, wherein R1 is H, R2 is an optionally substituted aryl group, R3 is a halogen, R4 is H, X is O, and Z is a leaving group.

Art Unit: 1623

***Claim Rejections - 35 USC § 102***

The following is a new ground of rejection necessitated by the submission of new claims 30-46.

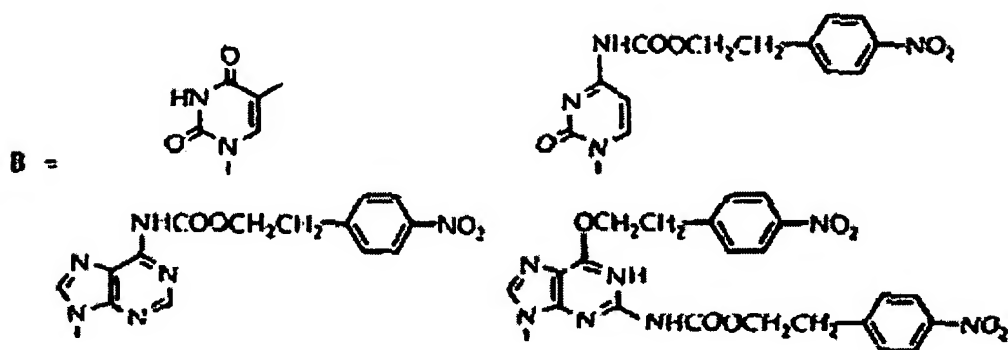
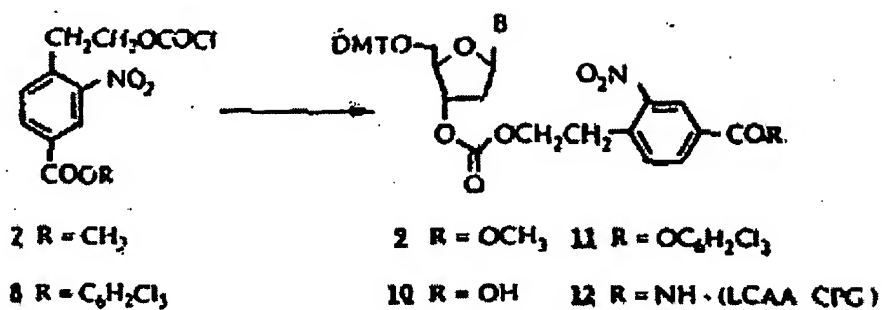
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 30-31, 35-39 and 45-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Eritja R. et. al. (Of Record). Compound 9 of Eritja et. al., (structure shown in the figure below) reads on compounds of claims 30-31 and 40-41, wherein R1 is COOY and Y is alkyl group of up to 10 carbon, R2 is H and R3 is H. (Figure 2, Page 4173 and Page 4179, Paragraphs 4-5). Note that the definition of R4, "up to 4 carbon atoms" is interpreted to include zero carbon atoms as well. Eritja et. al. discloses the substitution of bases thymine, protected-adenine, protected-guanine, and protected cytosine. (Page 4173, Figure 2, and Page 4180, First Paragraph, Compounds, 9 B=4-N-NPEOC-Cytidine and 9B =6-NPEOC-adenine.) These compounds read on claims 36-38. (Bases with protective groups are shown below). Eritja et. al. further discloses the use of phosphoramidites as O-protecting group. (Page 4173, Last paragraph).

Art Unit: 1623



Eritja et.al further discloses compound 7, (structure shown in the figure above), that read on compounds of claims 45 and 46. (Page 4173 and Page 4179, Paragraph 2). Thus, claims 30-31, 35-39 and 45-46 are anticipated by Eritja et. al.

### **Claim Rejections - 35 USC § 103**

The following is a new ground of rejection necessitated by the submission of new claims 30-46.

Art Unit: 1623

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfleiderer et. al. (U.S. Patent No. 5,763,599, Of Record).

The disclosure of the '599 patent is discussed above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the compounds of the instant application because they are broadly covered by the disclosure of the '599 patent.

One of ordinary skill in the art would have been motivated to make the compounds of the general formula I, and in particular the compounds the genus and sub-genus in claims 30-46 because they are broadly disclosed in the '599 patent for photolabile protection.

One of ordinary skilled in the art would have reasonably expected that the compounds claimed herein would have substantially similar or better effect as photolabile protecting groups.

Thus claims 30-46 are deemed obvious over the teachings of the prior art.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 1623

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roy P. Issac whose telephone number is 571-272-2674. The examiner can normally be reached on 9:00-5:00.

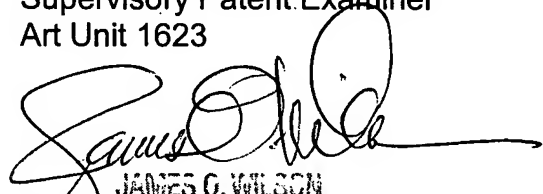
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia Anna Jiang can be reached on 571-272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1623

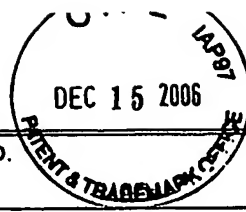
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Roy P. Issac  
Patent Examiner  
Art Unit 1623  
April 28, 2006

S. Anna Jiang, Ph.D.  
Supervisory Patent Examiner  
Art Unit 1623



JAMES G. WILSON  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1600



Form PTO 1449 (Modified)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY DOCKET NO. 272748US0X		SERIAL NO. 10/764,989	
LIST OF REFERENCES CITED BY APPLICANT				APPLICANT Sigrid BUHLER, et al.			
				FILING DATE January 26, 2004		GROUP 1623	
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	AA						
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						
	AM						
	AN						
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION YES NO		
	AO						
	AP						
	AQ						
	AR						
	AS						
	AT						
	AU						
	AV						
OTHER REFERENCES (Including Author, Title, Date, Pertinent Pages, etc.)							
/RI/	AW	HASAN, A., et al., "Photolabile Protecting Groups for Nucleosides: Synthesis and Photodeprotection Rates," Tetrahedron, Vol. 53, No. 12, 1997, pages 4247-4264					
	AX						
	AY						
	AZ					<input type="checkbox"/> Additional References sheet(s) attached	
Examiner				/Roy Issac/ (03/16/2007)		Date Considered 03/16/2007	
*Examiner: Initial if reference is considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

<b>Notice of References Cited</b>	Application/Control No. 10/764,989		Applicant(s)/Patent Under Reexamination BUHLER ET AL.	
	Examiner Roy P. Issac		Art Unit 1623	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,900,231	05-2005	Pan et al.	514/349
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.